

WHAT IS CLAIMED IS:

1. A method of constructing a halftone screen comprising:
 - defining a halftone screen frequency and screen angle according to a predetermined requirement;
 - defining a desired subcell having the predetermined frequency and screen angle requirement, wherein the subcell is substantially specified by two spatial vectors $\mathbf{v}_1 = (x_1, y_1)$ and $\mathbf{v}_2 = (x_2, y_2)$, wherein x_1 , x_2 , y_1 , and y_2 are real numbers;
 - forming a supercell comprising an array of the subcells, wherein the supercell is substantially specified by two spatial vectors \mathbf{u}_1 and \mathbf{u}_2 and wherein the relationship between the supercell and the subcell satisfies:
$$\mathbf{k}_1\mathbf{v}_1 + \mathbf{k}_2\mathbf{v}_2 = \mathbf{u}_1, \text{ and}$$
$$\mathbf{k}_3\mathbf{v}_1 + \mathbf{k}_4\mathbf{v}_2 = \mathbf{u}_2, \text{ where } k_1, k_2, k_3 \text{ and } k_4 \text{ are integer values.}$$
- 10 2. The method of claim 1, further comprising:
 - using particular integer values for k_1 , k_2 , k_3 and k_4 and $\mathbf{u}'_1(m_1, n_1)$ and $\mathbf{u}'_2(m_2, n_2)$, where m_1 , n_1 , m_2 and n_2 are integers to solve the supercell-subcell relationship for \mathbf{v}'_1 and \mathbf{v}'_2 , where \mathbf{v}'_1 and \mathbf{v}'_2 are approximate solutions of the desired subcell \mathbf{v}_1 and \mathbf{v}_2 ; and
 - comparing \mathbf{v}_1 and \mathbf{v}_2 with \mathbf{v}'_1 and \mathbf{v}'_2 .
- 15 3. The method of claim 1, wherein the step of solving the supercell-subcell relationship comprises directly searching for solutions.
- 20 4. The method of claim 1, wherein a plurality of supercell solutions are determined and further comprising:
 - applying a constraint to the determined solutions; and
 - removing supercell solutions that do not satisfy the constraints.
- 25 5. The method of claim 4, further comprising selecting a supercell solution that satisfies the constraint and creating a halftone screen using the selected supercell.

6. A method of constructing a halftone screen comprising:
selecting a frequency and screen angle of interest;
identifying a subcell by spatial vectors which satisfies the selected frequency and
5 screen angle of interest;
forming a supercell comprising an array of the subcells, wherein an integer
relationship exists between the supercell and the subcells;
solving the integer relationship;
testing one of any resulting solutions according to any additional constraints or
10 tolerances; and
if any of the resulting solutions satisfies the testing, creating a halftone screen
using the tested solution.